

Notice of Allowability

Application No.

10/730,295

Examiner

David S. Blum

Applicant(s)

CHOI, KYEONG KEUN

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/21/05.
2. ☒ The allowed claim(s) is/are 1-16, 18 and 19.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

This action is in response to the amendment filed 9/21/05.

Reasons for Allowance

1. Claims 1-6, and 18-19 are allowed.

2. The following is an examiner's statement of reasons for allowance:

Claim 1 limits the filling of the trench where the bottom of the trench is wider than the top and where the insulating layer is formed using a SOD or SOG oxide film, while the insulating film is not formed at both corners of the bottom of the trench due to a coverage characteristic of a spin coating oxide film. This limitation, in combination with the other limitations of claim 1 is not taught or suggested by the prior art of record.

Liang (US005972758A), Lin (US006716757B2), and Tanaka (US006841452B2) all form trenches with bottoms wider than the top and fill the trenches so that the insulating film is not formed at both corners of the bottom of the trench, but none of the cited references teach or suggest the use of a spin on material. Although it is known to fill trenches with spin on materials, none of the cited art teaches this in reference to forming gaps as in the instant claim.

Claims 2-16 and 18 are allowed as being properly dependent upon claim 1.

Claim 19 limits the filling of the trench where the bottom of the trench is wider than the top, where a polymer generated by a first etch and remains on the sidewall of the trench as a mask for a second etch to make the bottom of the trench wider than the top, and

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where the insulating layer is formed in the trench but not at the corners of the trench bottom due to a coverage characteristic of an insulating film. This limitation, in combination with the other limitations of claim 19 is not taught or suggested by the prior art of record. Liang (US005972758A), Lin (US006716757B2), and Tanaka (US006841452B2) all form trenches with bottoms wider than the top and fill the trenches so that the insulating film is not formed at both corners of the bottom of the trench, but none of the cited references teach or suggest a polymer generated by a first etch and remaining on the sidewall of the trench as a mask for a second etch to make the bottom of the trench wider than the top. Marty (WO 02/103772 A2) and The (EP001209738A2) form trenches with air gaps at the lower corners, but do not form trenches that are wider on the bottom, nor do they teach a polymer residue remaining on the sidewall after the first trench to mask the sidewall for a second etch. Although it is known to fill trenches with spin on materials, none of the cited art teaches this in reference to forming gaps as in the instant claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Blum whose telephone number is (571)-272-1687) and e-mail address is David.blum@USPTO.gov .

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached at (571)-272-1702. Our facsimile number all patent correspondence to be entered into an application is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David S. Blum

December 21, 2005